2018 Application for Section 205(j) Water Quality Planning Grant

Division of Water Resources
North Carolina Department of Environmental Quality

1. Basic Information			
Project Title:	***Stormwater Education, Assessments and Planning for the Town of White Lake, NC***		
Project start date:	***February 15, 2019***	**Project end date:**	***June 30, 2020***

Project Abstract:

White Lake has been a popular recreational lake for generations of North Carolinians. It is unique by comparison to the other Bay Lakes, with very acidic, but clear water, rather than the dark, tea-colored water seen in the other lakes. Within the past decade there has been a decline in the clarity of the water and a dramatic change in its acidity; there are now periods in which the water is not acidic (low pH), but rather strongly basic (high pH).

With the changing of the lake chemistry from acidic to basic, conditions favoring harmful cyanobacteria (blue-green algae) and the invasive aquatic weed Hydrilla were established. A cyanobacterial bloom developed in late summer of 2017 which greatly affected water clarity, and the high chlorophyll a levels (an indicator of algal biomass) exceeded the state standard of 40 μg/L for the first time. The bloom persisted into the spring of 2018, and as a result greatly elevated pH levels (up to 9.6 standard units) were found throughout the lake by early May, with further reductions in water clarity. An aquatic vegetation survey conducted in the fall of 2017 found Hydrilla present in moderate levels in over 80% of the lake area.

The Town of White Lake received approval to arrange for and fund an in-lake treatment with alum to flocculate and remove algae and nutrients from the water column. The treatment was conducted in May 2018 and as a result, the filamentous cyanobacteria that had dominated algal biomass were gradually eliminated, pH levels were significantly reduced, water clarity gradually and significantly improved, and nutrient levels were reduced.

It is recognized that in-lake treatments are a short-term solution to harmful algae blooms; in many cases, successful lake restorations require a combination of in-lake and watershed management actions, because internal nutrient loading alone can fuel algae blooms.

Long-term lake and watershed management will require a comprehensive assessment of the issues that are impacting the water quality and groundwater supply to White Lake, so that effective solutions can be developed and implemented. At the watershed level, these issues include increases in regional groundwater withdrawals and land use changes, with a reduction in forested/wetland areas and increased surface water runoff. At the sub-watershed level, the potential issues include external nutrient loading from stormwater inputs and aging wastewater infrastructure. At the lake level, the issues to examine include the relative importance of internal nutrient loading, waterfowl nutrient contributions, changes in the residence time and flushing of the lake system, and changes in the uses of the lake.

The stormwater education, assessment and planning work described in this proposal is another component in the information-gathering process which will be critical for the development of a comprehensive watershed plan for the management and protection of this unique resource for future generations of North Carolinians.

205(j) Grant Funds Requested	***$19,600***
Match (optional, recommended)	***$20,000***
Total Project Cost	***$39,600***

2a. Primary Contact or Project Manager: ***A one-page Statement of Qualifications must be provided in Section 4 of the application form to confirm that anyone designing, installing, or monitoring the proposed project is qualified to do so.***					
Name	***Jean Klein and Jim Perry***				
Title	***Regional Planning Director (JK) and Special Projects Planner (JP)***				
Organization Name	***Lumber River Council of Governments***				
Mailing Address	***30 C.J. Walker Road, COMtech Park***				
City	***Pembroke***	***State***	***NC***	***ZIP***	***28372***
Email Address	***jean.klein@lrcog.org***				
Telephone	***910-521-7556***		***FAX No.***		***910-521-7556***

2b. Administrative Address: ***Address where contract will be mailed for signature.***					
Name	***David Richardson***				
Title	***Executive Director***				
Organization Name	***Lumber River Council of Governments***				
Mailing Address	***30 C.J. Walker Road, COMtech Park***				
City	***Pembroke***	***State***	***NC***	***ZIP***	***28372***
Email Address	***david.richardson@lrcog.org***				
Telephone	***910-775-9752***		***FAX No.***		***910-521-7556***
Federal Tax ID Number	***56-0985258***				

2c. Payment Address: ***Address where invoice payments will be mailed.***					
Name	***Thomas Pulickal***				
Title	***Finance Director***				
Organization Name	***Lumber River Council of Governments***				
Mailing Address	***30 C.J. Walker Road, COMtech Park***				
City	***Pembroke***	***State***	***NC***	***ZIP***	***28372***
Email Address	***tp@lrcog.org***				
Telephone	***910-775-9769***		***FAX No.***		***910-521-7556***

3. Statement of Qualifications for project manager and primary partners
Please include qualifications of people, not organizations. Do not copy and paste entire CVs. Briefly describe relevant experience, noting any relevant 205(j) grant funded projects.

Jean Klein, Regional Planning Administrator for LRCOG- Jean has worked in the Lumber River Region as a planner water/wastewater infrastructure consultant for 9 years. In this capacity she assists local governments with projects to examine the efficiency and effectiveness of their water/wastewater infrastructure systems. Specific projects include the development of Asset Management Plans, rate studies, customer base evaluations and applications for project funding. Prior experience includes work as a local government administration and water infrastructure funding and development planning.

Jim Perry, LRCOG Special Projects Planner – over 40 years of local government experience as a Planner for Bladen County (1977-81), Executive Director of the LRCOG (1981-2012) and Special Projects Planner (2012-current). He has extensive experience in water resource and other planning disciplines. Water resource planning includes the study of the region's ground water aquifers, local and regional water supply and demand issues, ground and surface water quality, and water/sewer infrastructure.

Dr. Diane Lauritsen is a Water Quality Scientist with LIMNOSCIENCES and Environmental Chemistry Inc. (Envirochem). She has worked on water quality monitoring projects in the Great Lakes region as well as the Southeast, including rivers and lakes in North Carolina. She is the project manager for the long-term water quality monitoring project at White Lake and is assisting in the development of a planning process for the restoration of water quality in the lake.

Dr. Bill Hunt is an Associate Professor and Extension Specialist in the Department of Biological and Agricultural Engineering at North Carolina State University. He has assisted with the design and implementation of more than 150 stormwater control measures and is an active researcher with multiple ongoing projects, funded by the Clean Water Management Trust Fund, the NCSU Water Resources Research Institute and the NC Department of Transportation. He teaches short courses and workshops throughout North Carolina and the United States.

4. Project Partner Information: *If further space is needed to adequately describe partners' role/contribution to project, please include in the Statement of Qualifications section.*			
Agency Name	Town of White Lake		
Agency Address	1879 White Lake Drive, White Lake, NC 28337		
Role/contribution to Project	In-kind assistance and cash match		
Contact Person	Brenda Clark, Town Clerk	*Phone No.*	910-862-4800
E-mail address	bclark@whitelakenc.org		
Agency Name	NC State University Dept. of Bio & Ag Engineering Stormwater Program		
Agency Address	210A Weaver Administration Building, NCSU, Raleigh, NC 27695-7625		
Role/contribution to Project	Consultants for education/outreach, program design, project design		
Contact Person	Dr. Bill Hunt	*Phone No.*	919-515-6751
E-mail address	Bill_Hunt@ncsu.edu		
Agency Name	NC Department of Transportation, Whiteville office		
Agency Address	1194 Prison Camp Rd., Whiteville, NC 28472		
Role/contribution to Project	In-kind engineering assistance; provide as-built information on DOT stormwater infrastructure at White Lake		
Contact Person	Ken Clark	*Phone No.*	910-642-3760
E-mail address	klclark@ncdot.gov		
Agency Name			
Agency Address			
Role/contribution to Project			
Contact Person		*Phone No.*	
E-mail address			

5. General Goal of the Project (per the Clean Water Act Section 604(b)/205(j) grant purpose)			
Identify most cost effective and locally acceptable facility and nonpoint source measure to meet and maintain water quality standards	Develop implementation plan to obtain state and local financial and regulatory commitments to implement measures identified	Determine the nature, extent, and cause of water quality problems in various areas of the state	Other—please specify water quality planning purpose
		X	

6. Project Area	
Results Site-Specific, Regional, or Statewide?	Site-specific
River Basin	Cape Fear
Need identified in Basin Plan? (Y/N; note plan name, date, pg#)	No. The last update to the Cape Fear River Basin Plan was done in 2005, and the Bladen Lakes were not assessed.
Watershed name	Turnbull Creek-Cape Fear River
Watershed size	33.1 square miles Sub-watershed: 21,187 acres
(For site-specific projects only) 12 digit USGS HUC(s)	O30300060602 Sub-watershed: Lower Turnbull Creek-Cape Fear
County	Bladen

7. Project Milestone Schedule

If anticipating starting project in second quarter, can leave first quarter blank. Please note anticipated dollar amount, percent of grant spent that quarter, and cumulative percent of grant spent for project. Quarterly invoices will only be reimbursed up to percent indicated. Unused funds will carry forward to next quarter. Note that 10% of grant will be held until receipt of Final Project Report.

Quarter	Activities or outputs to be accomplished	Anticipated $ amount / % of funding spent / cumulative % spent
First Quarter Jan-Mar 2019	Initial water quality/stormwater workshops with stakeholders; working group begins stormwater situation assessment; conduct monthly in-lake water quality monitoring (*this work is supported by the Town of White Lake, and is ongoing*); including physiochemical parameters, nutrients, algal composition and biomass Quarterly report will summarize of water quality monitoring results from 2018, as well as provide an update on workshops, including stakeholder concerns and understanding of water quality issues.	15% / $2940 quarter / $2940 cumulative
Second Quarter Apr-June 2019	Begin mapping and evaluation of data to determine relative impact of outfalls/direct inputs to the lake; conduct water quality sampling of significant stormwater direct inputs during/after rainfall; conduct monthly in-lake quality monitoring. Continue to meet with stormwater working group, and review examples of stormwater/land development ordinances from similar municipalities. Quarterly report to include copies of outreach materials developed for the Town of White Lake Water Festival (held the third weekend in May).	20% / $3920 quarter / $6860 cumulative

Third Quarter Jul - Sept 2019	Continue in-lake water quality monitoring and sampling of stormwater outfalls. Continue to develop and provide educational and outreach materials for lakeshore property owners and town staff and public officials. Conduct additional water quality/lake management workshops and discuss various stormwater management options for consideration by the Town. Quarterly report to include a summary of outreach actions taken for Lake Appreciation Month (July), and a summary of water quality data provided for a State of the Lake report to the Town at their July 2019 Board Meeting.	25% / $4900 quarter / $11,760 cumulative
Fourth Quarter Oct - Dec 2019	Provide BMP options for nutrient reduction in NCDOT drainage ditches. Finalize mapping of outfalls and determine priority areas for potential BMPs. Continue workshops and propose options for a municipal stormwater management program. Quarterly report to include a summary of mapping data provided to the Town as a GIS layer.	15% / $2940 quarter / $14,700 cumulative
Fifth Quarter Jan - Mar 2020	Continue in-lake water quality monitoring and provide a summary for 2019 monitoring activities. Develop consensus relative to recommended management actions. Quarterly report to include a summary for 2019 monitoring activities, and an outline for final project report.	15% / $2940 quarter / $17,640 cumulative
Sixth Quarter Apr - Jun 2020	Complete and submit final project report.	10% / $1960 quarter / $19,600 cumulative

8. Map of project area: *Please copy map into document as a small image file.*

9. Detailed description of the project
(Note: if developing a Watershed Restoration Plan, please also complete section 16)

Determination of the nature, extent, and cause of water quality problems related to stormwater input to White Lake will include the following:

1. ***Education and Outreach***. Workshops will be conducted prior to stormwater assessments (early 2019) and after the assessments and mapping are completed. Topics for the introductory session will include stormwater water quality impacts; how municipalities and small communities manage stormwater; understanding Best Management Practices (BMPs) and how they are used to improve water quality. Subsequent outreach will be tailored to the specific needs of the community, as determined by the assessments. Educational materials and communications will be developed for the Town to post on its website as well.

2. ***Lake Management/Stormwater Assessments***: GPS geolocation of direct inputs, drainage ditches and other significant surface water inputs to the lake, identify pipe size and composition as appropriate, and track the sources of runoff back to origination, if possible. Review aerial photography records to identify areas that have had significant changes in land use to identify potential sources of increased surface water runoff. This activity is not being undertaken or funded by any other resource. This activity will take place along the shoreline that is located with the town limits of White Lake. The future development of any stormwater controls would be confined to the Town's jurisdiction.

3. ***Lake Management/Stormwater Water Quality Assessments***: Conduct water quality sampling of potentially significant inputs during rainfall events. This sampling will help prioritization of the contributing sources as part of any stormwater management plan and lake restoration efforts.

4. ***Lake Management/Stormwater Mapping***: Produce a GIS map of stormwater location data, including existing NC Department of Transportation stormwater infrastructure. The layer(s) created by this project will be added to an existing GIS mapping portfolio that includes the Town's water and sewer infrastructure as well as tax parcel data.

5. ***Lake Management/Stormwater Planning***: Use information generated to determine priority areas and options for stormwater control, including the use of stormwater fees to support a stormwater management program.

6. ***Lake Management/Stormwater BMP Design***: In cooperation with NCDOT, develop a stormwater water quality improvement project (design stage) for the DOT drainage ditches that flow into the lake.

10a. Related Projects in the Watershed

Please note any other water quality or conservation projects in the same watershed that contribute to the same goals as the proposed project. These could be own or partners' related water quality planning or implementation projects. If few or none, note how this project will fill a need.

The Town of White Lake has contracted with scientists from the Bald Head Conservancy and UNC-Wilmington to assess groundwater flows into the lake, and also the potential for nutrient loading from the wastewater collection system (using ^{15}N isotope sampling in the lake), and that project will be completed in March of 2019. The Town has also contracted with Envirochem/LIMNOSCIENCES to conduct long-term water quality monitoring in the lake, and is presently reviewing a proposal for sediment core collection/nutrient analysis, in order to assess the relative importance of internal phosphorus loading in White Lake.

NC DWR conducts lake assessments every five years; their 2018 sampling was conducted from May to September, with the next scheduled assessment in 2023.

North Carolina State University scientists have been conducting submerged aquatic vegetation surveys in White Lake, with the most recent survey completed in October 2018. NC DWR Aquatic Weed Control Program and NC Wildlife Resources Commission have assisted with funding for these surveys.

The LRCOG is heavily involved with Asset Management Planning for the Town's water and sewer infrastructure and has a number of projects that are either completed or on-going; the LRCOG completed an Asset Management Plan for the Town in 2016 and is preparing an application for updating the sewer portion of the plan that would expand work to include flow monitoring and CCTV examination of the sewer lines.

The LRCOG is also partnering with the NC Division of Water Resources to monitor groundwater levels and groundwater usage in the Southern Coastal Plain (including Bladen County) and asset management planning with the NC Division of Water Infrastructure.

10b. Relevance to Proposed Project (if applicable)
Help reviewers understand local capacity:

- *How might these projects might benefit or complement the proposed project?*
- *When were they completed?*
- *Who implemented/maintains them?*

The Cape Fear River Basin Plan was completed in 2005 (a recent presentation given to the NC Environmental Management Commission indicates that an update to that plan is underway). The Bladen County Bay Lakes were not assessed as part of the plan, because of their acidity. This speaks to the need to support more water quality, infrastructure, land use and groundwater assessments so that integrated, comprehensive planning can be initiated.

11. What funding sources exist to implement the results of the project?

Funding sources would be identified as part of this project. They will likely include a stormwater utility fee for the Town, W/S infrastructure and water quality funds.

12. (Optional) Photos or diagrams: *include photos or diagrams if they would supplement project narrative and improve reviewers' understanding of your project.*

13. Funding Requested

Note: If a significant portion of funding is in contractual line, please break down contractual line items in section 15.

Budget Categories (itemize all categories)	Section 205(j)		Non-Federal Match (recommended, but not required)	Total	Justification (Include explanation for each budget line item)
	Year 1	Year 2			
Personnel/Salary					
Fringe Benefits					
Supplies	600	600	250	$1,450	GPS Software for iPad, supplies and materials for workshops and educational products; cash match by Town of White Lake
Equipment	400	0	500	$900	iPad, probe for pH meter; cash match by Town of White Lake
Travel			600	$600	Travel to White Lake for workshops and assessments
Contractual	4,960	11,540	17,150	$33,650	In-kind matches by Town of White Lake and NC DOT; cash match by Town of White Lake. Includes costs for GIS services and staff assistance in geolocating stormwater outfall
Other	900	600	1,500	$3,000	Laboratory testing; cash match by Town of White Lake
Total Direct	$6,860	$12,740	$20,000	$39,600	
Indirect (max. 10% of direct costs, per 40 CFR 35.268)					
Annual Totals	$6,860	$12,740	$20,000		
Grand Total	$19,600		$20,000	$39,600	
% of Total Budget	49%		51%	100%	

14. Match summary (if applicable—recommended, but not required)	
Total Match amount	$20,000
Cash Match	$17,100
Source(s):	Town of White Lake
In-kind Match	$2,900
Source(s):	Town of White Lake ($1,600) and NC DOT ($1,300)

15. Contractual budget – IF APPLICABLE *If a significant portion of funding is in contractual line, please break down contractual line items here.*					
Budget Categories (itemize all categories)	Section 205(j)		Non-Federal Match (recommended, but not required)	Total	Justification (Include explanation for each budget line item)
	Year 1	Year 2			
Contractual Services: Education and Outreach; Planning	$1,000	$2,900	$6,250	$10,150	NCSU Stormwater Group, LRCOG, Limnosciences
Contractual Services: Stormwater Assessments	$3,960	$2,140	$4,600	$10,700	NCSU, Limnosciences, Public Services, Town of White Lake ($1600 in-kind)
Contractual Services: Water Quality Assessments		$1000	$1,000	$2,000	Limnosciences/Envirochem
Contractual Services: Stormwater Mapping		$2,000	$3,300	$5,300	Mapping coordinated by LRCOG GIS staff; In-kind match ($1,300) provided by NC DOT staff, Whiteville office
Contractual Services: Stormwater BMP Design		$3,500	$2,000	$5,500	NCSU Stormwater Group
Total Contractual	$4,960	$11,540	$17,150	$33,650	
Indirect (max. 10% of direct costs, per 40 CFR 35.268)					
Annual Totals	$4,960	$11,540	$17,150		
Grand Total				$33,650	
% of Total Budget	14.74	34.29			

16. (Only for applicants developing a 9-Element Watershed Restoration Plan) Please indicate below what sources you will use to find or develop the information necessary to meet EPA's 9 Key Elements.	
1	An **identification of the causes and sources** or groups of similar sources that will need to be controlled to achieve the load reductions estimated in the watershed
2	A **description of the NPS management measures** that will need to be implemented to achieve load reductions as well as to achieve other watershed goals identified in the watershed based plan
3	An **estimate of the load reductions** expected for the management measures
4	An **estimate of the amount of technical and financial assistance needed** associated costs and or sources and authorities that will be relied upon, to implement the plan
5	An **information/education component** that will be used to enhance public understanding of the project
6	A **schedule for implementing the NPS management measures** identified in this plan that is reasonably expeditious

7	A description of interim, **measurable milestones for determining whether NPS management measures** or other control actions are being implemented
8	A set of **criteria that can be used to determine whether loading reductions are being achieved** overtime and substantial progress is being made towards attaining water quality standards
9	A **monitoring component** to evaluate the effectiveness of the implementation efforts over time measured against the criteria established under item 8.

If you have questions or need assistance filling out this application, please do not hesitate to contact 205(j) grant administrator Maya Cough-Schulze at (919) 807-6442 or maya.cough-schulze@ncdenr.gov.